

Claims

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2 1. A method of controlling the fabrication of an optical device having a given property
3 at a defined wavelength, the method comprising:
4
5 providing a substrate;
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7 depositing a material on the substrate to form a film thereon;
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9 controlling a set of manufacturing parameters as the film is being formed on the
10 substrate to make the optical device;
11
12 generating an optical signal having a given wavelength;
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14 dithering the wavelength of the optical signal;
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16 applying the dithered optical signal to the film being formed on the substrate to modulate
17 the optical signal; and
18
19 using a feedback control, through a state machine with a wavelength locked loop, to
20 generate correlation signal representing the difference between the given wavelength and
21 the defined wavelength and to use the correlation signal to adjust at least one of the
22 manufacturing parameters to make the optical device with said given property at the
23 defined wavelength.
- 1 2. A method according to Claim 1, wherein the film transmits a signal modulated by the
2 difference between the defined wavelength and the given wavelength of the optical
3 signal, and step of using a feedback control with a wavelength locked loop includes the
4 step of positioning a sensor to receive the signal transmitted from the film and to
5 generate a signal representing said difference.

1 3. A method according to Claim 2, wherein the step of using a feedback control with a
2 wavelength locked loop further includes the steps of processing the signal generated by
3 the sensor to generate the correlation signal, and applying the processed signal to adjust
4 said at least one of the manufacturing parameters.

1 4. A method of controlling the fabrication of an optical device having a given property
2 at a defined wavelength, the method comprising:

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4 providing a substrate;

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6 depositing a material on the substrate to form a film thereon;

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8 controlling a set of manufacturing parameters as the film is being formed on the
9 substrate to make the optical device;

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11 generating an optical signal having a given wavelength;

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13 dithering the wavelength of the optical signal;

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15 applying the dithered optical signal to the film being formed on the substrate to modulate
16 the optical signal;

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18 generating a correlation signal representing the difference between the given wavelength
19 and the defined wavelength; and

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21 using the correlation signal to adjust at least one of the manufacturing parameters to
22 make the optical device with said given property at the defined wavelength.

1 5. A method according to Claim 4, wherein the steps of generating the optical signal,
2 dithering the wavelength of the optical signal, applying the optical signal to the film,
3 generating the correlation signal, and using the correlation signal all occur during the
4 depositing step to provide a real-time control of the fabrication of the optical element.

1 6. A method according to Claim 4, wherein the film transmits a signal modulated by the
2 difference between the defined wavelength and the given wavelength of the optical
3 signal, and the generating step includes the step of positioning a sensor to receive the
4 signal transmitted from the film and to generate a signal representing said difference.

1 7. A method according to Claim 6, wherein the generating step further includes the step
2 of processing the signal generated by the sensor to generate the correlation signal.

1 8. A method according to Claim 4, wherein the applying step includes the step of
2 transmitting the optical signal through the film.

1 9. A method according to Claim 4, wherein the applying step includes the step of
2 reflecting the optical signal from the filter.

1 10. A method according to Claim 4, wherein:

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3 the depositing step includes the step of depositing the material on the substrate at an
4 adjustable rate; and

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6 the using step includes the step of using the correlation signal to adjust the rate at which
7 the material is being deposited on the substrate.

1 11. A system for controlling the fabrication of an optical device having a given property
2 at a defined wavelength, the method comprising:

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4 means for depositing a material on an optical substrate to form a film thereon;
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6 a control subsystem for controlling a set of manufacturing parameters as the film is
7 being formed on the substrate to make the optical device;
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9 a light subsystem for generating an optical signal having a given wavelength and for
10 applying the optical signal to the film being formed on the substrate to modulate the
11 optical signal;
12
13 a dither source for dithering the wavelength of the optical signal;
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15 a feedback circuit for generating a correlation signal representing the difference between
16 the given wavelength and the defined wavelength, and for using the correlation signal to
17 adjust at least one of the manufacturing parameters to make the optical device with said
18 given property at the defined wavelength.

1 12. A system according to Claim 11, wherein the feedback circuit provide a real-time
2 control of the fabrication of the optical element.

1 13. A system according to Claim 11, wherein the film transmits a signal modulated by
2 the difference between the defined wavelength and the given wavelength of the optical
3 signal, and the control circuit includes a sensor to receive the signal transmitted from the
4 film and to generate a signal representing said difference.

1 14. A system according to Claim 13, wherein the feedback circuit processes the signal
2 generated by the sensor to generate the correlation signal.

1 15. A system according to Claim 11, wherein the light subsystem directs the optical
2 signal through the film.

1 16. A system according to Claim 11, wherein the light subsystem directs the optical
2 signal to the film, and the optical signal is then reflected from the film.

1 17. A system according to Claim 11, wherein:

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3 the depositing means includes means for depositing the material on the substrate at an
4 adjustable rate; and

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6 the feedback circuit includes means for using the correlation signal to adjust the rate at
7 which the material is being deposited on the substrate.

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